

EXPLANATION OF PLATE 13.

cv=contractile vacuole. *n*=nucleus. *ps*=pseudopodia. *v*=vacuole.

All the figures $\times 520$.

- Figs. 1-2. *Dactylospherium radiosum*, Blochmann. Two forms; fig. 2, showing spirally-twisted pseudopodia.
- 3-6. *Hyalosphenia platystoma*, sp. n. Figs. 3-5 showing the front view of the shell with its broad aperture; fig. 6, seen from the side. Fig. 4 shows a curiously contracted state of the animal in which the body-protoplasm is closely applied to the dorsal part of the shell.
- 7-11. *Hyalosphenia inconspicua*, sp. n. Fig. 7, living animal, showing pseudopodium and nucleus; figs. 8-11, empty shells. Fig. 11 is the basal view of a shell showing the elliptical mouth.
- 12-15. *Sphenoderia pulchella*, sp. n. Figs. 12, 14, and 15, empty shells; fig. 13, living animal. Fig. 15 is the basal view of the shell, showing the small, round aperture.
- 16-19. *Nuclearia conspicua*, sp. n. Figs. 16 and 17, animals with pseudopodia extended; fig. 18, contracted state of the animal. These animals contain a number of Desmids, the bodies of which have been more or less digested. Fig. 19, two pseudopodia after slight mechanical stimulation.

The *Ingolfiellidæ*, fam. n., a new Type of Amphipoda.

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(PLATES 14 & 15.)

THE greatest depth explored by the Danish 'Ingolf' Expedition (during the two summers of 1895 and 1896) was 1870 fathoms, and the Station in question (No. 38) is a little south of the entrance to Davis Strait. In the trawl was obtained slightly more than one litre of mud, which was carefully treated with a sieve covered with silk-gauze. This small portion of bottom-material contained a number of Crustacea new to science, among which were two new aberrant types of very small sessile-eyed Malacostraca. Of one of these forms only a single specimen could be detected; it presents a rather strong resemblance to the Caprellidæ, but it is at once apparent that the pleopods on the long abdomen differ exceedingly from those of every other Amphipod hitherto known. Some years after I found a specimen of an allied species in sieved material procured by

Dr. Th. Mortensen on the shore of one of the islands in the Gulf of Siam. In the report on the Crustacea collected by the 'Ingolf' to be published in the future, I could scarcely include the Siamese species, and I resolved therefore to give a separate account of both forms. The type deviates so much from other Amphipoda in several particulars, that the publication of this treatise on the family may be justified.

It may be convenient to begin with the description of the two species; secondly, to point out the essential characters of the type, comparing it with other Amphipoda; then to supply a diagnosis of the new family; finally to set forth some remarks on the tribes of the Amphipoda and the place and rank of the *Ingolfiellidæ*, fam. nova.

I. *Description of the Species.*

1. INGOLFIELLA ABYSSI, n. gen. et n. sp. (Pl. 14. figs. 1-18 ; Pl. 15. figs. 19-21.)

Body (fig. 1).—The animal is very elongate, between fourteen and fifteen times longer than deep, round, thus being filiform, and without processes or tubercles; hairs are not to be found on the head, the thorax or the abdomen, the telson excepted. The first thoracic segment is considerably deeper in front than posteriorly, more closely connected with the head than with the second thoracic segment, yet sharply separated from the head, but the movement which may be possible between these two parts must at most be rather feeble. The second thoracic segment is much longer but not deeper than the first, one and a half times longer than deep; from this segment to the third segment of the abdomen the segments increase gradually somewhat in depth, and the last-named segment is as long as the sum of the second thoracic segment and one half of the first segment, but not quite twice as deep as the second. The third abdominal segment has the lower portion of the postero-lateral margin very oblique, without vestige of any angle, and the following segments decrease posteriorly in depth and length. The abdomen is slightly shorter than the combined length of the six posterior thoracic segments; its segments are all excellently defined. The thoracic 'epimera' are not developed as plates, but only as small basal joints of the legs.

Head (fig. 2).—It is more than one and a half times longer than deep; rounded. A small angle is developed dorsally between

the insertions of the antennulæ, but a real 'rostrum' does not exist. The angle between the antero-lateral and the lower lateral margin is rounded off, and this lower margin is without any protruding angle or process. The antero-lateral margin has at the middle a small plate *which is marked off by a real articulation*; this plate, which is freely projecting, and somewhat higher than long, with the anterior margin curved, must be interpreted as an eye-lobe, but visual elements could not be discovered.

Antennulæ (fig. 2).—These are slightly longer than the head and the two anterior thoracic segments. The peduncle measures a little more than two-thirds of the whole antennula; its basal joint is rather robust and somewhat longer than the sum of the two distal joints, which are subequal in length and considerably more slender than the first; each of the two distal joints with two subapical short hairs. The flagellum consists of four joints, decreasing much in thickness from the second to the fourth (fig. 3); the first joint is about as long as deep, the second considerably longer, as long as the third, which is slightly shorter than the fourth; the second and third joints each with two or three subapical setæ; the fourth joint with about seven apical setæ of various length. On the distal lower angle of the three distal joints is found an olfactory seta (*o.*); the proximal seta is as long as the terminal joint, and the two others a little shorter; all these setæ are thick, with the end broadly obtuse and the wall membranous. An accessory flagellum (fig. 3, *a.*) is developed, originating from the inner and lower side of the end of the peduncle, and reaching a little beyond the middle of the second joint of the other flagellum; it is three-jointed, the first and the third joint short and subequal in length, the second somewhat longer than both combined; the two distal joints each with a couple of short hairs.

Antennæ (fig. 2).—These are a little shorter than the antennulæ, and as a whole somewhat more slender. The peduncle is slightly more than twice as long as the flagellum; its three distal joints decrease from the base in length and thickness; the proximal short joints without any projecting angle or spine; the penultimate joint with a single seta on the lower side. The flagellum is slender, decreases gradually in thickness, and consists of five joints; the four proximal joints are subequal in length, the fifth slightly longer; each of the two distal joints has a few short apical setæ.

Mouth.—The *labrum* (fig. 4) is considerably broader than long, rounded on the sides; the posterior margin with the middle half rather strongly convex.—The *left mandible* is shown from below and a little from the outer side in fig. 5, while fig. 6 exhibits its distal half from behind and below with a higher degree of enlargement. The cutting-edge is rather short, with a submedian incision. The movable lobe, 'lacinia mobilis' (*l.*), consists of a large plate and four setæ; the plate has both the anterior and the posterior angle of the terminal edge produced into a small tooth, while the setæ are very thick and increase much in thickness towards the end, which has an incision on the terminal margin. The molar process (*m.*) is very curious, *being shaped as a very long, very slender, and nearly straight cone*, the distal part of which is exceedingly slender with the apex acute. A mandibular palp is wanting. The right mandible has been seen only from below; some smaller differences exist most probably between it and the left mandible in the shape of the cutting-edge, and especially of the movable lobe, but the molar process is formed as that of the other mandible.—The *hypopharynx* (paragnatha) (fig. 9) has a very oblique, rather thick lobe on each side; the lobe terminates anteriorly near the median line in an obtuse end adorned with a couple of very short setæ.—The *maxillulæ* (fig. 7) are interesting, but I have not been able to make out the elements of their basal portion. The inner lobe (originating from the first joint) is rather well developed, with two short setæ on its terminal margin; the outer lobe (originating from the third joint) is strong, distally truncate, with about five very thick setæ, and three of these are adorned with branches on their inner side. The palp is well developed, and consists, as in most Gammarina, of two joints, but the first is longer than in any other Amphipod known to me, much longer and somewhat broader than the second joint, which has four elongate setæ on the terminal margin.—The *maxillæ* (fig. 8) are much smaller than the maxillulæ; the basal elements could not be distinguished from each other; the two lobes are rather short and broad, with some long and moderately strong setæ on the terminal margin.—The *maxillipeds* (fig. 10) are long, seven-jointed; the first joint of one maxilliped is coalesced in slightly more than two-thirds of its length with the corresponding joint of the other appendage; the second joint is on the inner half of the upper side produced into a lobe which is not marked off by any suture, reaches almost

to the end of the third joint, and has a couple of short setæ on the terminal rounded margin. The third joint is slightly longer than the second, *without a vestige of any lobe*, but with two setæ on the lower side near the inner margin. The three following joints are somewhat longer than the proximal ones, each with only one seta, which on the fourth and fifth joints is inserted at the inner margin, on the sixth more distant from that margin. The seventh joint is subconical, with two distal setæ, and terminating in a long setiform claw.

First Pair of Thoracic Legs (fig. 2).—The basal joint is short, considerably broader than long, rounded off anteriorly. The second joint is nearly as long as the segment, about twice as long as broad, with the posterior margin very convex. The third and fourth joints are short, with a short subapical hair on the lower margin. *The fifth joint forms the hand*, which is somewhat longer than the head, oblong, almost three times longer than broad, with the anterior margin rather strongly but not regularly convex; the apparent posterior margin is as a whole sinuate but slightly convex, consisting of the palm and the free posterior margin, which are marked off from each other by a minute process (fig. 11, *p.*), and the palm is two and a half times longer than the free posterior margin. The palm (fig. 11) presents a feeble, somewhat angular incision near its proximal end, and just above that point a rather small but robust spine originating on the inner surface near the margin; the palm beyond the incision is feebly convex, with some faint saw-teeth and a few minute hairs on the distal half, on the proximal half a small spine from the inner surface and two short setæ on the outer side. In the hand no internal gland could be discovered. The finger consists of three elements about equal in length, viz., the sixth joint, the seventh joint, and the real claw (fig. 11); notwithstanding *the whole finger is claw-shaped*, considerably curved, and about two-thirds as long as the hand. The articulation between the sixth and the seventh joint is irregularly sinuate and the movement allowed must be slight; the sixth joint contains, however, two slender muscles to the seventh joint. The seventh joint is coalesced with the claw, a transverse suture between them cannot be discovered, but the posterior distal angle of the joint is produced into an oblong triangle, which is sharply marked off from the posterior margin of the claw.

Second Pair of Thoracic Legs (fig. 2).—In the main similar to

those of the first pair, but differing in a number of rather small features. The basal joint is much broader but not longer than that of the first leg, not produced. The second joint as long as that of the preceding pair, but it increases almost gradually in breadth from the base to the end, and the posterior margin is slightly convex. The fifth joint, the hand, is somewhat shorter but not more slender than that of the first pair, two and a half times longer than broad, with the anterior margin considerably less convex than that of the first pair, and the basal third is much broader than the distal third. The apparent posterior (lower) margin of the hand is constituted of the real posterior margin and the palm; these two parts are marked off from each other by a small triangular process (fig. 12, *p.*), and the palm is two and a half times longer than the margin mentioned. The palm presents the same two proximal spines as that of the first pair, but these spines are somewhat longer and considerably thicker; the major portion of the palm shows a number of minute saw-teeth and differs as a whole slightly from that of the first leg. The sixth and seventh joints (fig. 12) are a little thicker than the corresponding joints of the first leg; otherwise these joints and the claw do not present any deviating feature.

Third and fourth Pairs of Thoracic Legs (fig. 13).—These are equal in size and shape, each about as long as the sum of the third and fourth thoracic segments (fig. 1), and very slender. The first joint is small, transverse, about as broad as the second joint, which is two and a half times longer than broad. The fourth joint is somewhat shorter than, but as broad as the fifth, which is scarcely as long as but somewhat broader than the sixth. The seventh joint is oblong, not half as long as the sixth; the claw (fig. 14, *c.*) is well marked off, somewhat longer than the seventh joint (VII.), slightly curved, slender, decreasing a little in breadth from the base to a small spiniform tooth originating at the beginning of the very short, thin, and acute terminal portion. A single subapical seta on the fourth and the fifth joints, a couple of apical thin setæ on the sixth, and a very short apical seta on the seventh joint.—No glands could be discovered in these legs.

Fifth and sixth Pairs of Thoracic Legs (fig. 15).—Rather similar to the fourth pair, but a little shorter and differing in several smaller points. The second joint is somewhat broader; the fifth joint is slightly longer than the fourth, with about four

thick setæ along the terminal margin; the sixth joint is somewhat shorter and considerably more slender than the fifth; the claw (fig. 16, *c.*) is shaped as a moderately slender seta.

Seventh Pair of Thoracic Legs (fig. 17).—These are slightly longer than those of the fourth pair, with almost all the joints considerably more slender, and deviate besides in the following particulars:—The fourth joint is somewhat longer than the fifth, with a long apical seta on the posterior margin; the fifth joint posteriorly on the end with a couple of short setæ; the sixth joint is longer than the fifth; the claw is setiform.

Pleopods (fig. 18, *pl.*).—These are all equal as to shape and size. *Each pleopod consists of a moderately small, almost triangular plate*; the three margins of the triangle do not differ much from each other in length and all are a little convex; setæ are completely wanting, but at the postero-superior angle two feeble serrations can be seen; it is very movable, attached by the anterior end which is a little truncate. This plate is homologous with the long distal joint of the sympod; the basal portion of the sympod is absent in this species (in the following form it consists of a distinct joint).

Uropods (fig. 18).—The two anterior pairs are well developed, each of them consisting of a peduncle and two rami. The peduncle of the first pair is a little more than half as long as the segment, rather compressed, with the basal half of the outer side widened as a rounded wing; the outer ramus is styloform, slender, acute, and slightly shorter than the inner one; the latter is shaped as a very oblong plate, slightly shorter than the peduncle, with about two longitudinal rows of long setæ on the inner side (fig. 19) near the upper margin, and terminating in four spiniform processes arranged in a very oblique row. The peduncle of the second pair is as long as its segment, somewhat longer and much broader than that of the first pair, moderately compressed on the distal half of its inner side, with four very oblique comb-shaped rows of numerous slender spines (fig. 20), and a single longer seta at the upper end of each of these rows; the rami are curved, acute styles, the outer one somewhat shorter than the other, and both with a few setæ on the proximal part. The third pair of uropods are very small, almost rudimentary (fig. 18); each (fig. 21) consists of two joints: the basal joint is short and very thick, the other is many times smaller, rounded, terminating in a single long seta.

Telson (fig. 18).—The telson is short, deep, rounded, with a couple of dorsal setæ.

Branchiæ.—An oblong branchia is found at the base of the third, fourth, and fifth pairs of legs; those belonging to the third and fourth pairs (fig. 13, *b.*) are longer and more narrow than the branchiæ of the fifth pair (fig. 15).

Age and Sex.—Marsupial lamellæ are entirely wanting; neither have I been able to discover male copulatory organs, but it must be added that in order to spare the legs of the animal I did not venture to examine it vertically from below. The specimens must therefore be regarded as probably immature, and I cannot determine the sex.

Length.—The specimen measures 2·5 mm. in length.

Locality.—The 'Ingolf' Expedition, Station 38; lat. N. 59° 12', long. W. 51° 05'; 1870 fathoms; temperature at the bottom 1°3; July 30, 1895.

Remarks.—The essential differences between this and the following species will be pointed out in 'Remarks' on the latter form.

2. INGOLFIELDIA LITTORALIS, n. sp. (Pl. 15. figs. 22–33.)

Body.—The animal is a little thicker in proportion to the length than the preceding species, almost thirteen times longer than deep; the third abdominal segment is only a little longer than deep. In other respects it is similar to *I. abyssi*, with the exception that the head, all thoracic and the five anterior abdominal segments are adorned with rather short dorsal setæ, one pair on each segment; on the head and the first thoracic segment these setæ are situated near the anterior margin (fig. 22), on the other segments at the end of the anterior fourth or third part (figs. 22 & 32).

Head (fig. 22).—The head differs from that of the preceding species in two particulars. The lower lateral margin has somewhat behind the base of the antennæ a prominent pointed angle. The eye-lobe is triangular, about as long as high, with the front end acute and the upper portion of its base not touching the lateral margin of the head; no visual organs could be detected.

Antennulæ (fig. 22).—These are slightly shorter than the sum of the head and the two anterior thoracic segments, somewhat more robust than in the preceding species and deviating besides in some particulars. The peduncle measures somewhat more than three-fourths of the whole appendage, and its basal joint,

which is somewhat thickened in the proximal half, measures almost one half of the whole antennula, while the two distal joints are subequal in length; all three joints with a few sub-apical setæ. The flagellum consists, as in *I. abyssi*, of four joints (fig. 23), but the second joint is as long as the first, and all joints, especially the third, are considerably thicker; the normal setæ as in the preceding form. Three olfactory setæ are also found in *I. littoralis*, but those on the second and the fourth joint are considerably shorter than that on the third joint, and the last-named seta is a good deal longer than its joint. The accessory flagellum (fig. 23) nearly as in *I. abyssi*, but a little thicker and reaching almost to the end of the second joint of the other flagellum.

Antennæ (fig. 22).—These are somewhat shorter than the antennulæ, considerably thicker than in *I. abyssi*, and differing in some other particulars. The peduncle is four times as long as the flagellum; of its three distal joints the intermediate one is considerably longer and a little thicker than the preceding joint, which is a little longer and considerably thicker than the terminal one. The flagellum consists, as in *I. abyssi*, of five joints, and it decreases gradually in thickness from the base to the end; the four proximal joints are subequal in length, while the fifth is very small. The antennæ possess more setæ than in *I. abyssi*, but their arrangement and length are shown in the figure.

Mouth.—I have not separated the appendages by dissection, but a view from the side did not present any difference worth mentioning from the preceding species.

First Pair of Thoracic Legs (fig. 22).—In the main similar to the same pair of *I. abyssi*, but presenting yet some specific characters. The first joint is considerably larger than in the other species, anteriorly produced in a triangular plate terminating in a seta. The hand is considerably longer than the head, two and a half times longer than deep; the anterior margin is rather strongly convex; the apparent posterior margin as a whole moderately convex; the palm is only a little longer than the real posterior margin and marked off from it by a small spiniform process. The proximal part of the palm has a rather long and thick marginal spine, and on each side of this a small spine (fig. 24) originating from the inner side near the margin. The sixth and seventh joints with the claw as in *I. abyssi*.

Second Pair of Thoracic Legs (fig. 25).—A little smaller than the first pair. The first joint is slightly produced anteriorly; the four proximal joints almost similar to those in *I. abyssi* but a little more slender, while the hand and the seventh joint present excellent specific characters. The hand is slightly more than twice as long as broad, increasing gradually in breadth from the base to the heel, which is situated at the end of the second third of the whole length. The free posterior margin is almost as long as the palm, which presents (fig. 26) some rather large irregular teeth, at the heel a rather long and thick spine, and just in front of this spine a smaller spine originating from the inner side near the margin. The sixth joint is twice as long as broad. The seventh joint (fig. 26) has on the posterior margin three robust oblique processes, the distal one the longest; the claw is slender, not marked off from the preceding joint.

Third and fourth Pairs of Thoracic Legs.—These are rather similar to the corresponding pairs of *I. abyssi*, but differ in some particulars. Almost all the joints are thicker (fig. 27) and their setæ a little more numerous; the fourth joint is only a little shorter than the fifth and as long as the sixth; the seventh joint has the postero-inferior angle somewhat produced, but rounded and terminating in a very short hair (fig. 28, VII.); the claw is shorter and thicker than in *I. abyssi*, terminating in two small diverging spiniform processes.

Fifth, sixth, and seventh Pairs of Thoracic Legs.—These legs are similar in structure, but the two anterior pairs (fig. 29) are somewhat shorter and considerably more robust than the seventh pair (fig. 31). They differ greatly from the corresponding pairs in *I. abyssi* in having the sixth joint a little longer than and as thick as the fourth, and especially in the structure of the terminal portion of the legs; the seventh joint is fused with the claw, and both these elements form together a robust curved "claw" (fig. 30), in which sometimes a very faint transverse line indicates its constituting parts, and sometimes this line could not be discerned. Figs. 29 and 31, as compared with figs. 15 and 17, show several smaller differences between these legs and the corresponding pairs of *I. abyssi*.

Pleopods.—The plates (fig. 32, *pl.*, and fig. 33) differ somewhat in shape from those of *I. abyssi*; the upper (outer) margin is only two-thirds as long as the lower one, the lower and the posterior margin form with each other an acute angle, and

the angle between the posterior and the upper margin is produced into a small triangular process directed backwards. The anterior, moderately narrow end of the plate is inserted on a short and rather narrow joint, which is withdrawn beneath the side-plate of the segment.

Uropods.—The first pair (fig. 32) differ from those of *I. abyssi* in two characters: the peduncle is considerably less widened on the outer side of its basal half, and the outer ramus is distinctly broader at the base, but considerably shorter, only half as long as the inner ramus. The second pair (fig. 32) are rather similar to those of *I. abyssi*, but the peduncle is even a little broader, with only three oblique rows of spines on the inner side, and the outer ramus is a little longer than the inner. The third pair are more slender than in *I. abyssi*, and a separate second joint could not be made out, but its long terminal seta is present.

Telson.—Scarcely so deep as in *I. abyssi* and the dorsal setæ are longer (fig. 22), otherwise as in the former species.

Branchiæ.—These are present on the three same pairs of legs as in *I. abyssi*, but they are nearly circular in outline (fig. 27, *b*.; fig. 29).

Age and Sex.—The animal appears to be immature, and the sex could not be made out.

Length.—The specimen measures 1.5 mm. in length.

Locality.—Gulf of Siam, on the coast of the isl. of Koh Chang, in bottom-material obtained (Jan. 17, 1900) by Dr. Th. Mortensen from corals, 1 fathom.

Remarks.—Among the numerous differences between this species and *I. abyssi*, the shape of the "claw" on the three posterior pairs of thoracic legs is, undoubtedly, the most interesting. Among the others some may be especially pointed out, viz., the shape of the eye-lobes, of the basal joint of the first pair of thoracic legs, shape and armature of the first and especially of the second hand with its finger, finally the shape of the pleopods.

II. *The Essential Characters of the Type.*

At the first glance the two species appear somewhat similar to the Caprellidæ, but on a closer examination it is seen that *Ingolfiella* is very distinct from that family, so different, in fact, that it is not more related to it than to some other families: it occupies in reality a very isolated position.

Ingolfiella is clearly distinguished from all Amphipoda Gammarina and Caprellina (*sens. Stebbing*) by at least four characters. Two of these are of very high rank, viz. the complete separation of eye-lobes from the head and the structure of the pleopods; the two other characters are less important, viz. the elongate styliform shape of the molar process of the mandibles, and the structure of the first two pairs of prehensile hands, in which the fifth joint is developed as a hand and the two distal joints, together with the real claw, are so completely claw-shaped that a similar structure has not been observed in any other form.—Two other characters seldom met with in any other Amphipod, viz., the relative development of the joints of the palp of the maxillulæ, and the structure of the seventh joint with its claw of the third and fourth pairs of thoracic legs, have not been deemed worthy of enumeration together with the four characters above mentioned.

Ingolfiella agrees with the family Caprellidæ—of the tribe Caprellina—in some features: the body is filiform, without “epimeral” plates; the first thoracic segment is more broadly and more closely connected with the head than with the following segment. But from the tribe Caprellina, *Ingolfiella* is separated not only by the four characters distinguishing it from all Amphipoda, but also by some other features to be enumerated. The antennulæ have an accessory flagellum which is absent in the Caprellina; the abdomen, which is only a little shorter than the thorax, has the full number of well-defined segments and six pairs of appendages; the seventh joint and the claw are very sharply separated on the third and fourth pairs of thoracic legs; branchiæ are present on the third, fourth, and fifth pairs of legs, but in the Caprellina branchiæ are always wanting on the fifth pair. Furthermore, *Ingolfiella* differs from the family Caprellidæ in some additional features: in the palp of the maxillulæ the first joint is unusually long, longer than the second, while in the Caprellidæ the second joint is very much longer than the first; the maxillipeds have no lobe from the third joint and their second joints are not coalesced in the median line, but in the Caprellidæ at least the basal parts of the second joints are coalesced and the third joint has a well-developed lobe; the first prehensile hand is a little larger than the second, and of both pairs the hand itself is the fifth joint, but in the Caprellidæ the first hand is much smaller than the second and

the hand itself is the sixth joint. All the differences enumerated between *Ingolfiella* on the one side and the tribe Caprellina or especially the family Caprellidæ on the other side, prove that the new type is very distant from the "Læmodipoda" and cannot be regarded as an intermediate form between some family of the Gammarina and the family Caprellidæ.

When *Ingolfiella* is compared with the families of the tribe Gammarina, fresh difficulties are met with. The genus differs from all Gammarina hitherto known not only by the four characters printed above in italics, but besides by the filiform body without "epimeral" thoracic plates and by some other less important characters. It is easy enough to see that it has nothing to do with such families as the Lysianassidæ, the Ampeliscidæ, the Stegocephalidæ, the Gammaridæ, &c., but it is impossible for me to point out any family to which it is really related. When we compare it with the Corophiidæ and the Dulichiidæ (sens. Sars), the two families in which the epimeral plates are at most of very moderate size and sometimes small, and the last pair of uropods reduced or wanting, several differences are easily observed. The mandibles of *Ingolfiella* differ not only in the above-mentioned styliform molar process—in the two last-named families this process is short, thick, broadly truncate, and adapted for mastication—but also in its general shape and by not possessing the palp. In the maxillulæ of *Ingolfiella* the palp has the first joint proportionately elongate, the second joint short, while the first joint is short, the second very long in the Corophiidæ and Dulichiidæ as in all other Gammarina possessing a palp of normal length. I am acquainted with only one instance which may be said to be intermediate between *Ingolfiella* and other Gammarids, viz., the palp of *Eusiropsis Riisei*, Stebbing, which, according to that author (Trans. Linn. Soc. ser. 2, Zool. vol. vii. part 2, p. 40), "has a stout first joint, but the second is weak and tapering, scarcely longer than the first . . ." In the maxillipeds the third joint is without any lobe, but in the two families named this lobe is very large, much larger than the lobe from the second joint. The disappearance of the lobe from the third joint is very rare in the tribe Gammarina: Sars says (Crust. of Norway, vol. i. p. 234) that these lobes are "obsolete" in the family Stenothoidæ; in his figures of those appendages of *Stenothoë* and *Probolium* a rudiment of the lobes can be seen, but in *Metopa Alderi* (Bate)

they are absent (pl. 86); furthermore, the lobe has completely disappeared in *Anamixis Hanseni*, Stebbing (op. cit. p. 36, pl. 11). That the eyes have altogether disappeared in *I. abyssi* is not surprising, but it is very curious that they are also entirely wanting in *I. littoralis*, procured at a depth of only 1 fathom on the coast of an island surrounded by shallow water. So far as I know, no blind Amphipod living on the shore has been described. The antennulæ and antennæ of *Ingolfiella* are rather short and with very few hairs; they differ much from the same appendages in Corophiidae and Dulichiidae. The five posterior pairs of thoracic legs differ in general aspect by being slender and short, but the third and fourth pairs differ more materially in that the seventh joint and the claw do not resemble a "claw" as in the Corophiidae, Dulichiidae, and probably all other Gammarina.

III. *Diagnosis of the Family.*

That *Ingolfiella* must form the type of a new family, the Ingolfiellidæ, is, in my opinion, proved by the statements in the preceding section. The diagnosis of the family may be as follows:—

Body filiform, with the basal joint of the thoracic legs small, not developed as "epimeral" plates. Separate eye-lobes (without eyes) developed from the antero-lateral margin of the head. The antennulæ with accessory flagellum. The mandible with elongate styliiform acute molar process. The first joint of the well-developed palp of the maxillulæ longer than the second. The maxillipeds only with the major part of their first joints coalesced with each other; the third joint without lobe. The first segment of the thorax more closely connected with the head than with the second segment. The two anterior pairs of thoracic legs with a well-developed hand formed of the fifth segment, while the rest of these legs is claw-shaped; the prehensile hand of the first pair larger than the following pair. The third and fourth pairs of thoracic legs with a thin claw inserted on a much broader seventh joint. The abdomen long, with all the segments well separated from each other; the terminal joint of the sympod of the pleopods developed as a triangular plate without vestige of rami, hairs, or coupling-hooks.

The two anterior pairs of uropods normal; the third pair reduced. The telson thick, rounded.

When more material of the two species established in this paper has been procured, and new forms have been detected, it is possible that one or a few characters (marsupial plates, &c.) may be added to this diagnosis, and that some of the characters enumerated will be found to be only of generic value. From the structure of the antennulæ and antennæ, of the prehensile hands, the uropods, &c., it would be possible to compose a diagnosis for the genus, but only two species being as yet known a diagnosis would be rather uncertain, and I abstain therefore from the attempt.

IV. *The Rank and Position of the Family Ingolfiellidæ in the System.*

The order Amphipoda is generally divided into three tribes or suborders—Hyperina (Hyperidea), Gammarina (Gammaridea), and Caprellina (Caprellidea, Læmodipoda); and this division is maintained by the best modern authorities (Stebbing, G. O. Sars). The Hyperina is, so far as I can see, a very natural group compared with the other two tribes taken together, even if the diagnosis hitherto given for it should prove capable of being a little altered. The separation of the Caprellina from the Gammarina is, in my opinion, not very important from a strictly scientific point of view, but it is certainly very practical, and may therefore be accepted. If this separation is maintained, I think it necessary to establish a fourth tribe for the reception of the Ingolfiellidæ: this family is, according to the characters pointed out above, even more distant from the Corophiidæ, Dulichiidæ, &c., or from the Caprellidæ, than the last-named family, containing such genera as *Cercops* and *Proto*, is remote from the Dulichiidæ. So long as forms intermediate between *Ingolfiella* and some genus of the tribe Gammarina are not discovered, it will be necessary to maintain the Ingolfiellidæ as a tribe of the same rank as the Caprellina, and consider both as *parallel and analogous*; if the last-named tribe is withdrawn the tribe Ingolfiellina must also be suppressed and reduced to only a family of the Gammarina, which then should contain all genera not belonging to the Hyperina.

EXPLANATION OF THE PLATES.

PLATE 14.

Ingolfiella abyssi, n. gen. et n. sp.

- Fig. 1. The animal; $\times 28$.
 2. Head and the two anterior thoracic segments; $\times 82$.
 3. Distal part of the left antennula, from the outer side; $\times 164$.
a., accessory flagellum; *o.*, olfactory setæ.
 4. Labrum, from below; $\times 300$.
 5. Left mandible, from below and a little from the outer side; $\times 300$.
 6. Distal half of the left mandible, from behind and below; $\times 380$.
l., movable lobe; *m.*, molar process.
 7. Right maxillula, from below; $\times 300$.
 8. Right maxilla, from below; $\times 300$.
 9. Hypopharynx, from below; $\times 300$.
 10. Right maxilliped, from below; $\times 300$.
 11. Distal part of the hand and the following joints of the left first thoracic leg, from the outer side; $\times 170$. VI., sixth joint, containing two small muscles; VII., seventh joint; *c.*, claw; *p.*, process between the real posterior margin and the palm.
 12. Second left prehensile hand, from the inner side; $\times 187$. *p.*, process between the real posterior margin and the palm.
 13. Fourth left thoracic leg, from the outer side; $\times 82$. *b.*, branchia.
 14. Distal part of the fourth left thoracic leg; $\times 170$. VII., seventh joint; *c.*, claw.
 15. Fifth left thoracic leg, from the outer side; $\times 82$.
 16. Distal part of the fifth left thoracic leg; $\times 170$. VI., sixth joint; *c.*, claw.
 17. Seventh left thoracic leg, from the outer side; $\times 82$.
 18. The five posterior abdominal segments with their appendages; $\times 82$.
pl., third left pleopod.

PLATE 15.

Figs. 19–21. *Ingolfiella abyssi*, n. sp.

- Fig. 19. Distal part of the first right uropod, from the inner side; $\times 193$.
 20. Second right uropod, from the inner side; $\times 193$.
 21. Third left uropod, from the outer side; $\times 240$.

Figs 22–33. *Ingolfiella littoralis*, n. sp.

- Fig. 22. Head and first thoracic segment; $\times 130$.
 23. Distal part of the right antennula from the inner side; $\times 310$.
 24. Distal part of the hand and following joints of the left first thoracic leg, from the inner side; $\times 310$.
 25. Second right thoracic leg, from the outer side; $\times 130$.

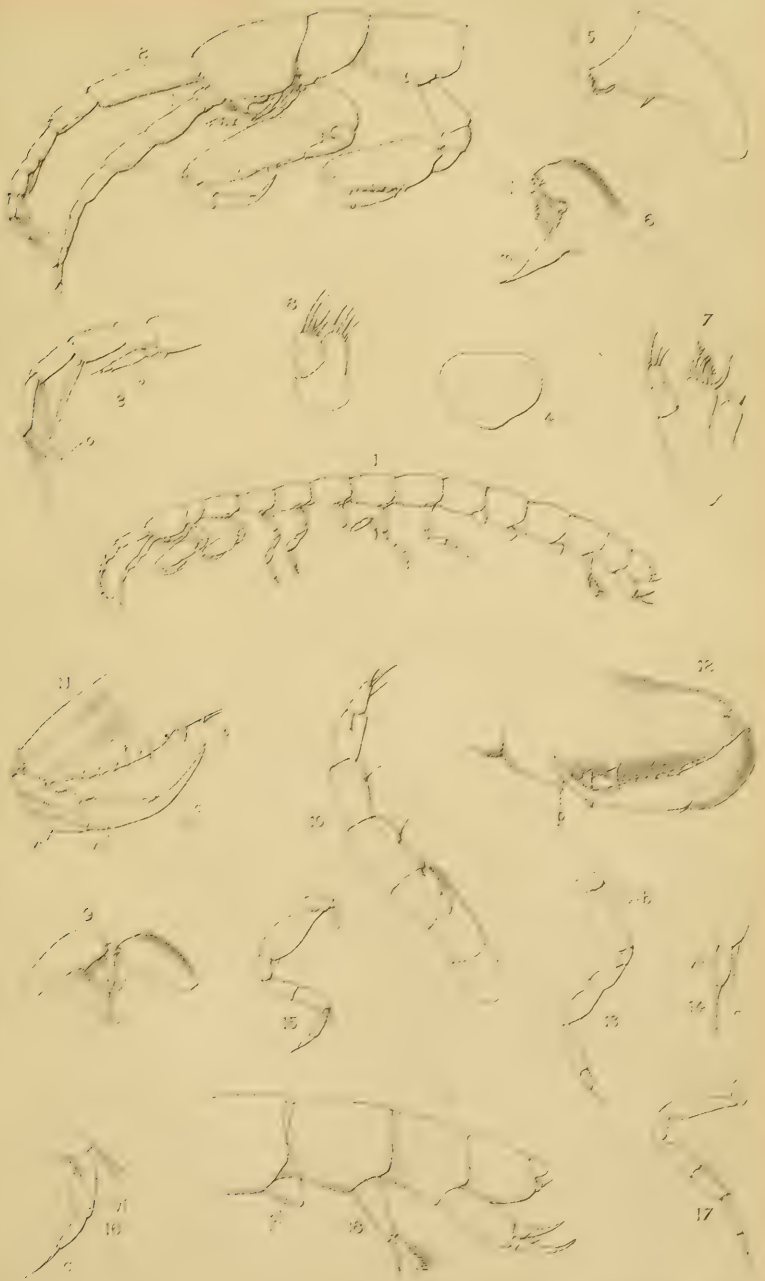
- Fig. 26. Distal part of the second right prehensile hand, from the outer side ;
 × 310.
27. Fourth left thoracic leg, from the outer side ; × 130. *b.*, branchia.
28. Distal part of the fourth left thoracic leg, from the outer side ; × 310.
vii., seventh joint.
29. Fifth right thoracic leg, from the outer side ; × 130.
30. Distal part of the fifth right thoracic leg, from the outer side ; × 295.
vii., seventh joint ; *c.*, claw.
31. Seventh left thoracic leg, from the outer side ; × 130.
32. The posterior segments of the abdomen with their appendages ; × 130.
pl., pleopod of the third pair.
33. First left pleopod, from the outer side ; × 310.

COPEPODA CALANOIDA, chiefly Abyssal, from the Faroe Channel
 and other parts of the North Atlantic. By Canon A. M.
 NORMAN, M.A., D.C.L., LL.D., F.R.S., F.L.S.

[Read 7th May, 1903.]

THE Copepoda to which the following paper has reference are from the northern parts of the North Atlantic Ocean. The larger number of them were procured by Sir John Murray in the 'Triton' Expedition of 1882, when they were taken in the Faroe Channel at various depths down to 600 fathoms. The deep-water forms were captured in a tow-net attached to, or near to, the dredge. It was not a closing net, and therefore the depths must be regarded only as approximate. A few specimens were from the 'Valorous' Expedition of 1875, and the remainder were the product of a very interesting tow-net gathering sent to me by Professor Haddon from 200 fathoms, 40 miles N.N.W. of Achill Head, Ireland.

At the time when they were found, most of the species in this list were new to science, but pressure of other work prevented my taking them in hand. I had named them partially, and when Professor G. O. Sars commenced his beautiful work, which is just finished, on the Calanoida, I sent some of these and other specimens to him for his use, believing at that time that he purposed to include the species of the Faroe Channel in his work, but he did not extend its range so far. He has now returned the specimens, and I have had the advantage of his determination of many of the more difficult forms, and of the Arctic species



H. J. Hansen, del.

J. I. Rennie Peck, Lith. Edin'

A NEW TYPE OF AMPHIPODA

